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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/724,058

12/01/2003

Yung-Jun Park

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03/02/2005

STAAS & HALSEY LLP

SUITE 700

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EXAMINER

CASCHERA, ANTONIO A

ART UNIT

PAPER NUMBER

2676

DATE MAILED: 03/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/724,058

Applicant(s)

PARK ET AL.

Examiner

Antonio A Caschera

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5 and 8-15 is/are rejected.
- 7) ☒ Claim(s) 4,6 and 7 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in the pending application.
2. Acknowledgment is made of applicant's claim for domestic priority under 35 U.S.C. 119(e).

Claim Objections

3. Claim 8 is objected to because of the following informalities:
 - a. The phrase, "...wherein the pixel value is comprises the..." (see line 1 of claim 8) should be corrected to read, "...wherein the pixel value comprises the..." or something similar as seen in lines 1-2 of like claim 15.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 11-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 11 recites the limitation "the second upper limit value" and "the second lower limit value in line 4 of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 2, 5, 8, 9, 10 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Kim et al. (U.S. Patent 5,963,665).

In reference to claims 1 and 9, Kim et al. discloses a method and device for preserving brightness while enhancing contrast in an image (see columns 1-2, lines 65-2). Kim et al. discloses circuitry including a frame histogram calculator which calculates the probability density function of an input image (see column 5, lines 47-52), the input image further defined by pixels (see column 9, lines 49-50). Note, the office interprets the frame histogram calculator functionally equivalent to the probability density function calculator of applicant's claims. Kim et al. also discloses dividing the distribution calculated by the histogram calculator into two sub-images, producing two probability density functions one for each sub-image (see column 5, lines 55-59). Kim et al. discloses a first CDF (cumulative density function) calculator, receiving the one of the two probability density functions in which all image samples are equal to or less than a mean image level, and calculates the CDF for this sub-images' distribution (see column 5, lines 60-65). Note, the office interprets the CDF of Kim et al. functionally equivalent to the

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cumulative distribution function of applicant's claims. Also note, the office interprets the combination of the first CDF calculator and first mapper (described below) functionally equivalent to applicant's first setter and brightness value controller. Further, the setting of upper and lower limits is seen as equivalent to the dividing and CDF calculating of the sub-images based upon image sample values equal to or less than a mean value. The office also interprets the lower and upper limits of applicant's claims equivalent to the minimum possible distribution and mean level values, respectively, of Kim et al.. Kim et al. then discloses mapping the CDF values to greyscale values using a first mapper, eventually outputting brightness level values (Yh) based upon the CDF values and ultimately the input image (see column 6, lines 28-57, column 5, lines 1-5 and 30-33 and Figure 1, output "Y" of selector #120).

In reference to claims 2 and 10, Kim et al. discloses all of the claim limitations as applied to claims 1 and 9 respectively above in addition, Kim et al. discloses a second CDF (cumulative density function) calculator, receiving the other of the two probability density functions in which all image samples are greater than the mean image level, and calculates the CDF for this sub-images' distribution (see columns 5-6, lines 66-4). Note, the setting of second upper and lower limits is seen as equivalent to the dividing and CDF calculating of the second sub-image based upon image sample values that are greater than a mean value. The office further interprets the second lower and upper limits of applicant's claims equivalent to the mean level value and maximum distribution value possible, respectively, of Kim et al..

In reference to claim 5, Kim et al. discloses all of the claim limitations as applied to claim 1 above in addition, Kim et al. discloses calculating the CDF for each sub-image using an equation equivalent to the equation recited in applicant's claim (see column 4, lines 27-39).

In reference to claims 8 and 15, Kim et al. discloses all of the claim limitations as applied to claims 1 and 9 respectively above in addition, Kim et al. discloses the input image composed of greyscale pixel values (see column 3, lines 66-67 and column 9, lines 49-50) which the office interprets as inherently disclosing greyscale values of three primary colors as pixels are defined by having three primary colors, in the art of Computer Graphics.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (U.S. Patent 5,963,665).

In reference to claim 3, Kim et al. discloses all of the claim limitations as applied to claim 2 above. Although Kim et al., discloses dividing the distribution calculated by the histogram calculator into two sub-images (see column 5, lines 55-59), Kim et al. suggests two groups when he states, "...divides the grey level distribution calculated by histogram calculator into a predetermined number (e.g. two)..." (see column 5, lines 55-57). Therefore, at the time the invention was made, it would have been obvious to one of ordinary skill in the art to divide the distribution into three sub-images to obtain the first-third upper and lower limit values to use in CDF calculations. Applicant has not disclosed that utilizing specifically three ranges provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in

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the art, furthermore, would have expected Applicant's invention to perform equally well with the dual range division of distribution values of Kim et al. because the explicit number of distribution divisions, related to the amount of detail or resolution control in brightness levels, is a matter of design choice as preferred by the designer and to which best suits the application at hand. Therefore, it would have been obvious to one of ordinary skill in this art to modify Kim et al. to obtain the invention as specified in claim 3.

Allowable Subject Matter

7. Claims 4, 6 and 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In reference to claim 4, the prior art of record (Kim et al. (U.S. Patent 5,963,665) does not explicitly disclose a Bin Underflow Bin Overflow to adjust the probability density function according to the upper value limits and the lower value limits set by the first setter, second setter and third setter respectively, in combination with the further limitations of claim 4.

In reference to claim 6, claim 6 is objected as it is dependent upon objected to claim 4.

In reference to claim 7, the prior art of record (Kim et al. (U.S. Patent 5,963,665) does not explicitly disclose converting a cumulative distribution function into a mapping function of brightness levels using the formula recited in claim 7.

8. Claims 11-14 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

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In reference to claim 11, the prior art of record (Kim et al. (U.S. Patent 5,963,665) does not explicitly disclose adjusting the probability density function according to the upper value limits and the lower value limits set by the first setter and second setter respectively, in combination with the further limitations of claim 11.

In reference to claims 12-14, claims 12-14 are objected as they are dependent upon an objected to claim 11.

References Cited

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- a. Kim (U.S. Patent 5,937,090)
 - Kim discloses an image enhancement method and circuit obtaining a cumulative density function on the basis of a grey level distribution.
- b. Park (U.S. Patent 6,259,472 B1)
 - Park discloses a histogram equalization apparatus including CDF and PDF calculators.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Antonio Caschera whose telephone number is (703) 305-1391. The examiner can normally be reached Monday-Thursday and alternate Fridays between 7:00 AM and 4:30 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella, can be reached at (703)-308-6829.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

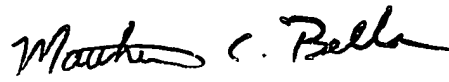
Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.



MATTHEW C. BELLA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

aac

2/16/05